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FINAL REPORT FOR DATA BASE DEVELOPMENT

SUBMITTED TO NASA
MARSHALL SPACE FLIGHT CENTER
CONTRACT #NAS8-36360

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NAS8-36360

INTRODUCTION

Contract NAS8-36360 Titled "Data Base Development" awarded to BAMSI began March 27, 1986 and ended March 26, 1989. The scope of this contract stated that the program would include, but not be limited to, the acquisition, transcription and verification of Metallic Materials Properties. The data gathered, along with updates to current data, will increase the information available to NASA in the Materials Selection List (MSFC-HDBK-527). This information will become part of the overall Materials and Processes Data Base System.

Effective May 14, 1986 Amendment 1 changed the classification of [redacted]

Effective June 17, 1986 Amendment 2 increased the funding of the contract [redacted]

Effective July 8, 1986 Amendment 3 changed the classification of [redacted]

Effective August 15, 1986 Amendment 4 described a minor change in the requirements of paragraph V, TASK 9, Sub-Task 1 of attachment J-1.

Effective August 29, 1986 Amendment 5 increased the total funds allotted by [redacted].

Effective February 5, 1987 Amendment 6 added the preparation of Payloads Data Base Specifically, IUS Materials, to paragraph V TASK 4.

Effective May 27, 1987 Amendment 8 furnished Government Property essential to the performance of the contract.

Effective July 16, 1987 Amendment 9 increased the contract amount [redacted]

Amendment 10 required reporting to Security all employees having NASA picture badges and Contractor employee air transportation.

DEVELOPMENT OF DATA BASES

The required data bases were developed on the NASA/MSFC Vax 8650 using the Oracle Data Base Management System. Oracle was given a subcontract to load their software onto the VAX, design the Data Bases, develop sample queries, sample menus, sample help screens and a interactive search mechanism. Oracle also educated BAMSI personnel on various aspects of the Oracle product including: system tuning, modification to Data Base structures and transfer of other Data Bases to Oracle. This knowledge was sufficient to allow BAMSI to develop input screens, data base tables and programs necessary to meet the data base needs. The data bases were complete with periodic upgrades for speed and user friendliness. A copy of the screens and table descriptions has been included in this report.

ALUMINUM ALLOYS DATA BASE

Reference Material

In order to fulfill the requirements set forth by NASA Materials and Processes Laboratory, several references were reviewed by our Metallurgist and EH02 Engineers. For various reasons, some of the references were found unsuitable for our TASK. The following references were suggested and approved by EH02: MIL-HDBK 5, Aerospace Structural Metals Handbook, Aluminum Association and Structural Alloys Handbook.

DEVELOPMENT OF DATA ENTRY FORMS

During the Selection of Reference Material, a rough draft of applicable data was compiled. Using this data, development of data entry forms began. Our Metallurgist, programmers and data analysts along with EH02 Engineers, fine tuned the data and data entry forms. The final draft of the forms were approved by NASA/MSFC. A total of 22 forms were approved for the Aluminum Data Base, they include: General, Specifications, Composition, Comments, Electrical Resistivity, Thermal Conductivity, Thermal Expansion Coefficient, Specific Heat, Mechanical Properties, Fatigue Strength, Corrosion, Optical Properties, Fracture Toughness, End Quench Hardenability, Bend Radius, Electrical Conductivity, Service Temperature Limits, Hardness, H_2 Embrittlement, Creep Rupture and Impact. A copy of each of these data entry forms has been provided. (Aluminum Alloys Data Entry Forms)

TRANSCRIPTION

Upon completion of data entry forms, data evaluation and transcription began. The evaluation process included selection of an Aluminum Alloy by a data analyst and transcription of the proper data onto each form. Not all data entry forms were used on all Aluminum Alloys due to a lack of applicable data. Our Metallurgist was available for interpretation of data that was unclear to the analysts.

DATA ENTRY

For all data except material codes and specifications, the data entry forms were sent to the data entry office at MSFC. Material codes, specifications and updates were entered inhouse. After data entry was completed, all data was verified before it was moved into production.

SURVEY

Upon completion of the Aluminum Alloys Data Base, a survey was conducted by our Metallurgist comparing our data to that found in the Aluminum Association Book. It was found that the Aluminum Alloys Data Base met the requirements of NASA/MSFC.

MISCELLANEOUS

Other material listed in this final report pertaining to Aluminum Alloys Data Base include: a list of aluminum alloys entered in the data base, data entry screens for Aluminum Alloys and a description of tables used in Metallic Properties (Aluminums) Data Base.

STEEL ALLOYS DATA BASE

REFERENCE MATERIAL

References selected for use in the Steel Alloys Data Base by EH02 include MIL-HDBK 5, Aerospace Structural Metals Handbook and Structural Alloys Handbook.

DEVELOPMENT OF DATA ENTERY FORMS

The data entry forms developed for Aluminums were used along with a form (Magnetic Properties) developed especially for the Steel Alloys Data Base. The form was finalized and approved by EH02 giving a total of 23 forms for Steels. A copy of these data entry forms has been provided.

TRANSCRIPTION

Transcription remained consistent with procedures used on the Aluminum Alloys Data Base.

DATA ENTRY

Data entry remained consistent with procedures used on the Aluminum Alloys Data Base.

SURVEY

Upon completion of the Steel Alloys Data Base, a survey was conducted by our Metallurgist comparing our data to that available. It was found that the Steel Alloys Data Base met the requirements of NASA/MSFC.

MISCELLANEOUS

Other material listed in this final report pertaining to Steel Alloys Data Base include: a list of Steel Alloys listed on the data base, Data entry screens for Steel Alloys and a description of tables used in Metallic Properties (Steels) Data Base.

WHERE USED

INTRODUCTION

The "Where Used" portion of the Materials and Processes Technical Information System (MAPTIS) is a set of data bases of Space Hardware. Each data base is a materials list for that specific piece of hardware.

SPACELAB MATERIALS DATA BASE

REFERENCES

The development of the Spacelab Materials Data Base required the reading and evaluation of apperture cards and the use of the MSFC Handbook 527 to complete to NASA/MSFC Standards.

DATA ENTRY FORMS

The data forms used for Spacelab consisted of Standard Materials Worksheet, Standard Materials Worksheet Supplement, Standard Materials Top Line Update, Standard/Commerical Parts Data Input, MMSDS Selection List Data Sheet-Non-Metallic and MATCO Directory Data Sheet-Metallic.

The old forms titled Standard Materials Worksheet, Standard Materials Worksheet Supplement and Standard Materials Top Line Update were changed as follows:

Materials Usage Entry Sheet Header/Next Assembly Information, Materials Usage Modification/Update Sheet. A copy of all forms used on the Spacelab Data Base has been included. (Where Used Data Entry Forms, old & new).

DATA ENTRY

As the data forms were completed, they were delivered to the Data Entry office at MSFC to be entered into the data base. Occasional online updates were required by inhouse personnel.

Transcription

Evaluation and transcription began upon delivery of the Spacelab Microfilm cards. NASA/MSFC supplied BAMSI with the proper forms and instructions with the data. Analysts took the the required data from the Microfilm with the use of a Microfilm Reader/Printer, also supplied by NASA/MSFC, transferred the given data to the proper form and referred to MSFC Handbook 527 for the remainder of the necessary information. While nearing completion of the data base, BAMSI was informed the data entry forms had been changed. Once the new forms arrived with instructions for usage, the transcription of the data was completed.

PAYLOADS DATA BASE

Contents

Located in the Payloads Data Base are two (2) materials lists, Space Telescope (HST) and Inertial Upper Stage (IUS), compiled by BAMSI.

References

The development of the HST and IUS Materials List required reading and evaluating microfilm cards and drawings. Using the MSFC Handbook 527 to gather data was also required by NASA/MSFC.

DATA FORMS

The data forms used for HST and IUS were Materials Usage Entry Sheet Header/Next Assembly Information, Material Usage Entry Sheet Materials Information and Materials Usage Modification/Update Sheet.

All of these forms were supplied by NASA/MSFC and a copy of each has been included in this report. (Where Used Data Entry Forms New)

Transcription

Transcription remained consistent with procedures used on the Spacelab Materials Data Base.

DATA ENTRY

Data entry remained consistent with procedures used on the Spacelab Materials Data Base.

WHITE SANDS TEST DATA

The White Sands Data was originally delivered to BAMSI for evaluation and data sheet preparation. The data sheets would then be delivered to the Data Entry Office at NASA/MSFC. It was later suggested and approved for BAMSI to evaluate the data and enter it online into the data base. This change proved to be beneficial to both BAMSI and NASA because delivery of the data became more efficient. A copy of the previously used form has been included (MMSDS Selection Data Sheet - Non-Metallic). Several trips were

Several trips were made to the White Sands Test Facility to familiarize BAMSI employees with test procedures and to relay to WSTF the information needed to accurately represent material test data in the Selection List Data Base.

STANDARDS DATA BASE

The Standards Data Base is a "Specifications and Standards Approval Baseline List". The data required to be entered is as follows:

> Document number, federal stock number, revision title, type, data latest revision, custodian, abstract.

The data references were furnished by NASA/MSFC and are listed on the Standards Data Base Entry Screen. A copy of the entry screen and data base table description has been included. FSN numbers and custodians were supplied by NASA personnel. BAMSI employees were responsible for all computer programming, data entry and data verification.